

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE

TECHNICAL SPECIFICATION

PEDESTAL CRANES AMENDMENTS/SUPPLEMENTS TO API SPEC/2C

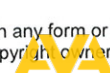
PTS 37.92.10.30

February 2010



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PTS No:	37.92.10.30
PTS Title:	Pedestal Cranes (amendments/supplements to API Spec 2C)

For PTS Updates/Review

This revision of PTS 37.92.10.30 – Pedestal Cranes (amendments/supplements to API Spec 2C) (February 2010, Revision 1) has been updated incorporating PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry code and standards.

The previous version of this PTS 37.92.10.30 (October 1994) will be removed from PTS binder/ e-repository from herein onwards.

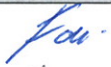
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Document Approval

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Revision History

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PREFACE

PETRONAS Technical Standards (PTS) publications reflect the views, at the time of publication, of PETRONAS OPU/Divisions.

They are based on the experience acquired during the involvement with the design, construction, operation and maintenance of processing units and facilities. Where appropriate they are based on, or reference is made to, national and international standards and codes of practice.

The objective is to set the recommended standard for good technical practice to be applied by PETRONAS' OPU in oil and gas production facilities, refineries, gas processing plants, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardisation.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where PTS may not cover every requirement or diversity of condition at each locality. The system of PTS is expected to be sufficiently flexible to allow individual operating units to adapt the information set forth in PTS to their own environment and requirements.

When Contractors or Manufacturers/Suppliers use PTS they shall be solely responsible for the quality of work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will expect them to follow those design and engineering practices which will achieve the same level of integrity as reflected in the PTS. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal or its technical advisor.

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PART I INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and gives recommendations for the design, procurement, manufacture, testing and inspection of pedestal and king-post mounted cranes on fixed offshore structures and/or floating platform structures used in drilling and production operations.

This PTS is based on API Spec 2C, 6th edition, 2004. Part II of this PTS is written as amendments and supplements to API Spec 2C. Sections of API Spec 2C that are not mentioned in this PTS shall apply as written.

Any project-specific requirements shall be specified by the Principal in the data requisition sheets (PTS 37.92.10.93, PTS 37.92.10.94, PTS 37.92.10.95 and PTS 37.92.10.96) or in the Specific Project Requirements (SPR), see the definition in Part II, 3.1.

This is a revision of the PTS of the same number dated October 1994; see (1.6) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by PETRONAS, the distribution of this PTS is confined to PETRONAS companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them.

This PTS is intended for use in offshore oil and gas drilling and production facilities.

When PTSs are applied, a Management of Change (MOC) process should be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements are more stringent than in this PTS the Contractor shall determine by careful scrutiny which of the requirements are the more stringent. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this PTS which is considered to be necessary in order to comply with national and/or local regulations.

1.3 DEFINITIONS

The **Contractor** is the party that holds the contract to carry out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Contractor is responsible for delivery of a completed crane unit. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for its design and construction. The Principal will generally specify the technical requirements. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicate a requirement.

The word **should** indicate a recommendation.

1.4 CROSS-REFERENCES

Where cross-references to other parts of this PTS are made, the referenced section number is shown in brackets. Other documents referenced in this PTS are listed in (Part III).

1.5 ORDER OF PRECEDENCE

The following descending order of precedence shall apply:

- National and local regulations;
- Purchase order/contract document;
- Requisition;
- This PTS;
- API Spec 2C.

Any conflict between this PTS and other referenced documents shall be referred to the Principal for resolution prior to contract award.

1.6 SUMMARY OF MAIN CHANGES

This PTS is a revision of the PTS of the same number dated October 1994. This has been a complete revision, bringing it in line with the sixth edition of API Spec 2C, and it is not practical to list the changes herein.

PART II AMENDMENTS/SUPPLEMENTS TO API SPEC 2C

The numbering and headings in this Part correspond to those in API Spec 2C, sixth edition, 2004. They include supplemental information, clarifications, modifications and additional requirements to API Spec 2C. Only those sections with clarifications, modifications and additions are included.

The Manufacturer's proposal shall address all items requested throughout this PTS and the Manufacturer shall complete the requisition where required) (e.g. diesel exhaust emission control, maximum vibration levels, instrument duties, etc.). All provisional information shall be stated as such.

The Manufacturer's quality management system shall comply with and be certified to ISO 9001.

Where the Manufacturer has standard practices that exceed the requirements of this PTS, they shall apply.

1. SCOPE

1.1 GENERAL

Add to this section:

This specification shall also apply to cranes mounted to ship-shape FPSO hulls.

The crane shall be suitable to perform the duties specified by the Principal in this PTS and the requisition.

1.4 COMMENTARY

Add to this section:

Appendix B of API 2C shall apply.

1.5 RECORD RETENTION

Add to this section:

In addition to maintaining the original inspection and testing records, the Manufacturer shall furnish a complete set of inspection and testing records to the Principal with the Crane Manufacturer's Data Books furnished to the Principal prior to crane delivery. Additionally, the Crane plans and information specified in the applicable regulations (e.g. 46 CFR subpart 107.309 in the USA) shall be furnished to the Principal as it is completed during the design and fabrication phases. The Principal shall provide necessary information to all regulatory agencies.

1.6 MANUFACTURERS SUPPLIED DOCUMENTATION

Modify item 5 as follows:

5. Failure mode assessment for gross unintended overloads.

2.0 REFERENCES

Add to this section:

Documents referenced in this PTS are listed in (Part III)

3.0 DEFINITIONS, ABBREVIATIONS and UNITS

3.1 DEFINITIONS

Add to this section:

certifying authority	Third party which may be appointed by the Principal to ensure design authenticity, compliance with national/local regulations and that the equipment is fit for purpose.
inspection authority	Party appointed by the Principal to ensure that the equipment supplied conforms to the requirements of this PTS. In some instances the inspection authority may be the same as certifying authority.
load path	All structural and equipment components or parts inclusive of and between hook and pedestal, which provide the reactions to resist forces and moments generated during the operation of the crane.
miscellaneous steel	All those steel parts, such as walkways, platforms, handrails, cable trays and brackets that are not primary or secondary steel.
primary steel	Any steel part or member of a critical component that transmits forces or moments and is essential in maintaining the structural integrity or operational safety of the crane.
requisition	Except where explicitly stated otherwise, data/requisition sheets PTS 37.92.10.93, PTS 37.92.10.94, PTS 37.92.10.95 and PTS 37.92.10.96, as applicable to the crane in question.
secondary steel	Any steel part or member that is not essential in maintaining the structural integrity or operational safety of the crane

3.2 ABBREVIATIONS

Add to this section:

MPI	Magnetic Particle Inspection
NDE	Non-Destructive Examination
RT	Radiographic Testing
SWL	Safe working load
UT	Ultrasonic testing
SPR	Specific Project Requirements

3.3 UNITS

Add to this section:

Once a System of Units has been selected for use, then the Contractor shall consistently use that system throughout the design.

4.0 CRANE RATINGS

4.1 GENERAL

Replace the second paragraph with:

For cranes on floating platforms and vessels, the Contractor shall use "The Vessel Specific Method" of establishing crane ratings. The details for platform and supply vessel motions shall be specified in the requisition.

For fixed platform cranes the Contractor shall use "The Default Dynamic Method" of establishing crane ratings. The crane minimum lift capacities shall be as specified in the requisition.

4.1.2.a Personnel Rated Loads

Replace this section with:

Personnel rated loads are intended to be applied to the auxiliary hoist system and shall be calculated based on a maximum of 25 % of the calculated SWL for non-personnel load ratings.

4.2.1 Load Rating Charts

Add to this section:

Contractor load charts shall reflect the number of parts of line as specified in the requisition. Additionally, Contractor load charts shall reflect all boom length configurations possible using the boom length(s) as specified in the requisition.

4.3.1.a Offboard Lifts

Add to this section:

The Auxiliary load hoist winch shall be capable of sustaining a minimum line speed of 60 m/min, regardless of sea state, with a single line configuration and with the wire rope operating on the highest layer of the winch drum.

4.4 OUT OF SERVICE LOADS

Add to this section:

The non-stowed and stowed out of service conditions shall be as specified in the requisition.

4.5 WIND, ICE AND SEISMIC LOADS

Add to this section:

Environmental loads including wave criteria, and wind, ice and seismic loads shall be specified in the requisition.

4.6 GROSS OVERLOAD CONDITIONS

Add to this section:

Failure mode assessments shall be performed by the Contractor and submitted to the Principal for review.

5.0 ALLOWABLE STRESSES

5.1 GENERAL

Add to this section:

The crane shall operate without loss of performance when installed about an axis that is one degree out of true in any direction.

All padeyes for offshore handling shall be designed for three times the dead weight of the item being lifted.

5.2 PEDESTAL, KING POST, AND PLATFORM CONNECTION

Add to this section:

The crane lateral deflection shall not exceed the unsupported extended length (L) divided by 180 (i.e. $L/180$). However, this shall not exceed limits specified by the swing bearing Manufacturer.

5.4 FATIGUE

Add to this section:

To calculate the maximum reactions and stresses of the pedestal, kingpost and other critical structural components for use in the fatigue analysis, the dead weight of the boom and the API recommended side loads shall be accounted for in addition to the prescribed load (i.e. $C_v \times SWL$). The API quantity of fatigue stress cycles (i.e. 25,000) shall be considered a minimum and additional cycles with boom dead weight and incidental loading shall be investigated. Stress ranges shall include the full stress range between tensile and compressive stresses. The minimum acceptable fatigue life shall be 30 years and the actual fatigue life shall be reported to the Principal.

5.5 CERTIFICATION

Add to this section:

The Manufacturer shall provide that written certification in the final documentation package.

6.0 DESIGN AUTHENTICATION AND TESTING

6.1 DESIGN AUTHENTICATION AND TESTING

Add to this section:

The Contractor shall inform the Principal, with the crane proposal, if the crane being proposed is 1) a prototype, 2) a major structural revision or 3) an earlier model crane in which case the load testing may not be repeated for this serial. If the crane is a prototype or a major structural revision the Contractor shall also inform the Principal of the 'Design Authentication' selected test method (e.g. Resistance Type Strain Gauge or Heavy Lift Load Test).

6.2 CERTIFICATION

Delete the first sentence. Add to this section:

The Manufacturer shall provide this written certification in the final documentation package.

6.3 OPERATIONAL TESTS

Add to this section:

The Contractor shall provide operational tests in accordance with this section. The Contractor shall provide in the proposal a description of the scope of testing and this shall contain a system performance test with simultaneous lifting, luffing and slewing operation. This is to ensure that individual systems perform as specified by the Principal during simultaneous operations.

If the overload test specified in API Spec 2C, Section 6.3.4, and further specified in the requisition, exceeds 1.1 times the rated capacity, then the Principal may elect to perform NDE of the critical connections and components, in accordance with the Principal approved procedure, to ensure that the connections and/or components were not damaged during the overload test. Any repairs needed following the NDE shall be performed by the Contractor, at the Contractor's expense.

7.0 CRITICAL RIGGING COMPONENTS

7.2 WIRE ROPE

7.2.1 Construction

Add to this section:

In addition to API Spec 9A, wire ropes may also be constructed to meet ISO 2408 or Principal approved equivalent standard. Load hoist wire ropes shall be Dyform, low rotational, multi strand Independent Wire Rope Core (IWRC) construction.

Boom hoist wire rope shall be Dyform, multi strand Independent Wire Rope Core (IWRC) construction. All pendant wire ropes for use on cranes in offshore duty shall be drawn galvanised to minimise the effects of saline corrosion.

All wire ropes shall be of a size and type of construction readily available from the Manufacturer's standard ranges. Unique sizes shall not be used.

The Contractor shall provide a fully authenticated and identifiable certificate of test with each wire rope supplied with the crane.

7.2.4 Design Factors

7.2.4.2 Suspension Systems

Add to this section:

The Contractor shall notify the Principal, in the proposal, if a bridle and pendant assembly will be utilized. If so, details of the suspension system shall also be provided. Pendant lines shall not exceed 51 mm diameter. If additional strength is required the number of pendant lines shall be increased but the diameter shall not exceed 51 mm.

7.3 WIRE ROPE END TERMINATIONS

Add to this section:

All end fittings/terminations design specifications shall be submitted by the Contractor to the Principal.

For wire rope end termination, only wedge sockets for running ropes and poured spelter or swaged sockets (Crosby or Principal approved equivalent) for pendant lines shall be used (i.e. no U-bolt or eye splice terminations are permitted).

7.3.3 Wedge Sockets

Add to this section:

Wedge socket efficiency shall be no greater than 80 % to 90 % of the wire rope capacity. Spelter socket and swaged-sleeve socket efficiencies may be assumed to be 100 %.

7.3.4 Termination efficiency

Add to this section:

Tied loop splices, with or without thimbles, shall not be used, as termination efficiency can be below 80 %.

7.4 SHEAVES

7.4.1 Requirements

Add to this section:

The Contractor shall provide the sheave material specification in the proposal.

7.4.1.1 Add to this section:

The sheave diameter to wire rope diameter ratio shall be 20 or greater if defined as such in the requisition. This applies to all sheaves.